

AIR FORCE QUALIFICATION TRAINING PACKAGE (AFQTP)



for
PAVEMENTS AND CONSTRUCTION EQUIPMENT OPERATOR
(3E2X1)

MODULE 16
COMPACTION EQUIPMENT

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Career Field Education and Training Plan (CFETP) references from 1 Apr 97 version.

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AIR FORCE QUALIFICATION TRAINING PACKAGES
for
PAVEMENTS AND CONSTRUCTION EQUIPMENT OPERATOR
(3E2X1)

INTRODUCTION

Before starting this AFQTP, refer to and read the “Trainee/Trainer Guide” located on the AFCESA Web site <http://www.afcesa.af.mil/>

AFQTPs are mandatory and must be completed to fulfill task knowledge requirements on core and diamond tasks for upgrade training. *It is important for the trainer and trainee to understand* that an AFQTP **does not** replace hands-on training, nor will completion of an AFQTP meet the requirement for core task certification. AFQTPs will be used in conjunction with applicable technical references and hands-on training.

AFQTPs and Certification and Testing (CerTest) must be used as minimum upgrade requirements for Diamond tasks.

MANDATORY minimum upgrade requirements:

Core task:

AFQTP completion
Hands-on certification

Diamond task:

AFQTP completion
CerTest completion (80% minimum to pass)

Note: *Trainees will receive hands-on certification training for Diamond Tasks when equipment becomes available either at home station or at a TDY location.*

Put this package to use. Subject matter experts under the direction and guidance of HQ AFCESA/CEOT revised this AFQTP. If you have any recommendations for improving this document, please contact the Career Field Manager at the address below.

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COMPACTION EQUIPMENT

MODULE 16

AFQTP UNIT 1

PERFORM OPERATIONAL CHECKS (16.1.)

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PERFORM OPERATIONAL CHECKS***Task Training Guide***

STS Reference Number/Title:	16.1. Perform Operational Checks
Training References:	<ul style="list-style-type: none"> • Local Technical Orders • Local Procedures
Prerequisites:	<ul style="list-style-type: none"> • Possess as a minimum a 3E231 AFSC.
Equipment/Tools Required:	<ul style="list-style-type: none"> • Roller • Personal Safety Equipment
Learning Objective:	<ul style="list-style-type: none"> • The trainee will be able to perform operational checks on a roller.
Samples of Behavior:	<ul style="list-style-type: none"> • The trainee will demonstrate the proper procedures for operational checks.
Notes:	
<ul style="list-style-type: none"> • Personnel are required to wear all personal protective equipment pertaining to each task (i.e. work gloves, hearing protection, and safety goggles) 	
<ul style="list-style-type: none"> • Any safety violation is an automatic failure. 	

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PERFORM OPERATIONAL CHECKS

Background: There are several makes of the same type of equipment found in the Air Force inventory. Specific preoperational inspection procedures can be found in the owner's manual that accompanied the equipment. It is important to properly check and service the equipment prior to operation.

To perform the tasks, follow these steps:

Step 1: Utilizing AF Form 1806

Check all items listed that pertain to the specific equipment you are checking.

Step 2: Vehicle Exterior

Inspection of the vehicle exterior begins with a 360-degree walk-around looking for damage and leaks. Check wheels/tires for wear, lugnut tightness, and correct air pressure. Check mirrors and windows for cleanliness and cracks.

HINT:

Puddles of fluid and dirty areas on the engine or ground normally indicate problem areas and should be investigated prior to operating.

Step 3: Drive Engine Compartment

Check engine oil, coolant, brake, power steering, and transmission fluid levels and fill as needed. Inspect the drive belts for wear, tension, and alignment. Ensure battery connections are secure and free from corrosion.

Step 4: Compaction Equipment Unique Items

There is a difference inspecting and maintaining steel wheel rollers from pneumatic-tired rollers. For instance, steel wheel rollers do not have tires but are equipped with steel drums that can be filled with fluid to increase roller weight. The drums should be inspected for pits and should also be drained after each day's use. The steel wheel roller and pneumatic-tired roller are equipped with scraper blades, cocoa mats, and sprinkler bars to keep foreign material from sticking to the drums and should be inspected to ensure they are functioning properly. The tires on the pneumatic-tired roller will be inspected for tire pressure, weather cracks, and wear. If the pressure is low, correct it on the spot. All tires must have the same air pressure. If tires are cracked or worn, turn the roller into maintenance for repair. Finally, grease both types of rollers. All bearings and fittings should be greased as stated in the Technical Order (T.O.).

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**Review Questions
for
Perform Operational Checks**

1. On the steel wheel roller, how do you increase the roller weight?	a. By adding water to the roller drums. b. By placing rocks on the fender wells. c. By decreasing the tire pressure. d. By increasing the tire pressure.
2. The inspection is the same on all rollers?	a. True b. False

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PERFORM OPERATIONAL CHECKS

Performance Checklist		
Step	Yes	No
1. Utilized AF Form 1806?		
2. Checked vehicle exterior?		
3. Checked drive engine compartment?		
4. Checked compaction equipment unique items?		

FEEDBACK: Trainer should provide positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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OPERATE COMPACTION EQUIPMENT

MODULE 16

AFQTP UNIT 2

STEEL WHEEL VIBRATORY ROLLER (16.2.4.)

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STEEL WHEEL VIBRATORY ROLLER

Task Training Guide

STS Reference Number/Title:	16.2.4. Steel Wheel Vibratory Roller
Training References:	<ul style="list-style-type: none">• Local Technical Order• Local Procedures
Prerequisites:	<ul style="list-style-type: none">• Possess as a minimum a 3E231 AFSC
Equipment/Tools Required:	<ul style="list-style-type: none">• Steel Wheel Vibratory Roller• Personal Safety Equipment• General Tool Kit
Learning Objective:	<ul style="list-style-type: none">• The trainee will be able to properly operate a steel wheel vibratory roller.
Samples of Behavior:	<ul style="list-style-type: none">• The trainee will demonstrate how to operate the steel wheel vibratory roller.
Notes:	
<ul style="list-style-type: none">• Personnel are required to wear all personal protective equipment pertaining to each task (i.e. work gloves, hearing protection, and safety goggles)	
<ul style="list-style-type: none">• Any safety violation is an automatic failure	

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STEEL WHEEL VIBRATORY ROLLER

Background: Anytime soil is disturbed, it becomes expanded and very loose. During construction requiring fill material, this loose soil must be compressed into a solid mass. This process of compressing loose soil is called compaction. If soil is not properly compacted during construction, it will settle and the road or runway will collapse. There are various types of compaction equipment used in the Air Force that you will be required to operate and one of these is the steel wheel vibratory roller. The steel wheel vibratory roller can be used for compacting base course and finishing asphalt.

Definition of Compaction. Compaction is the pressing together of soil particles into a closer state of contact, thus, expelling excess air and water.

Compaction Terms.

- Static Compaction – Uses the weight of the machine only to compact.
- Ballast Compaction – When extra weight is added to the machine (water, sand).
- Dynamic Compaction – The use of shock waves to compact soil particles.

Compaction Techniques.

- Compact in lifts – A lift is a single layer of material to be compacted. Best results are achieved when using 3 to 6 inch lifts.
- Compacting straight-line roads – Roll from ditch line to centerline to maintain crown.
- Compacting banked curves – Roll from bottom to top to maintain even thickness and prevent material being pushed down.
- Compacting speed – A slow walk not to exceed 3 mph

To perform the task, follow these steps:

Step 1: Pre-operational inspection.

Refer to Module 16, Units 1 and 3 for proper inspection maintenance procedures.

Step 2: Start Engine.

Ensure parking brake is set, transmission is in neutral, and Governor/direction control lever is in the neutral low idle position.

Step 3: Compact.

With engine running and governor/direction control lever in neutral, increase to full idle position, release the park brake and slowly move the control lever in the desired direction of travel. To change direction, move the lever to the neutral position bringing the roller to a complete stop, then move the lever to the opposite direction. Compaction can be done in both forward and reverse. When rolling subgrade or base course, overlap the previous compacted area from 12 inches to half the drive drum.

NOTE:

Never make sudden changes in direction with the compacting equipment.

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Step 4: Shutdown Procedures.

Place governor/direction control lever in the neutral position, decrease to the low idle position, apply park brake, and allow 3-5 minutes for engine cool down before shutting off engine.

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**Review Questions
for
Steel Wheel Vibratory Roller**

Question	Answer
1. Which type of compaction uses shock waves?	a. Static Compaction. b. Ballast Compaction. c. Dynamic Compaction. d. Reverse Compaction.
2. Compaction is best achieved if done in _____ to _____ inch lifts.	a. 1; 2. b. 2; 4. c. 3; 6. d. 8; 10.
3. When compacting subgrade and base course, how much overlap should you have?	a. 12 inches to half the drum. b. 6 inches to half the drum. c. 3 inches to half the drum. d. 3 to 6 inches.

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STEEL WHEEL VIBRATORY ROLLER

Performance Checklist		
Step	Yes	No
1. Performed pre-operational inspection?		
2. Started engine?		
3. Compacted?		
4. Followed shutdown procedures?		

FEEDBACK: Trainer should provide positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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COMPACTION EQUIPMENT

MODULE 16

AFQTP UNIT 3

PERFORM OPERATOR MAINTENANCE (16.3.)

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PERFORM OPERATOR MAINTENANCE

Task Training Guide

STS Reference Number/Title:	16.3. Perform Operator Maintenance
Training References:	<ul style="list-style-type: none"> • Owner's Manual
Prerequisites:	<ul style="list-style-type: none"> • Possess as a minimum a 3E231 AFSC
Equipment/Tools Required:	<ul style="list-style-type: none"> • Compaction Equipment • Personal Safety Equipment
Learning Objective:	<ul style="list-style-type: none"> • The trainee will properly perform operator maintenance checks on a dump truck
Samples of Behavior:	<ul style="list-style-type: none"> • The trainee will demonstrate steps in performing operator maintenance on dump trucks
Notes:	
<ul style="list-style-type: none"> • Personnel are required to wear all personal protective equipment pertaining to each task (i.e. work gloves, hearing protection, and safety goggles) 	
<ul style="list-style-type: none"> • Any safety violation is an automatic failure 	

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PERFORM OPERATOR MAINTENANCE

Background: Compaction equipment maintenance, like any other maintenance, is very important. If the machine is not running well then how is the job going to get done? The more effective maintenance program we have for the equipment, the better our operation will run.

Correct and timely operator maintenance ensures equipment will do the job when needed and last longer saving the Air Force needless expenditure. A good operator maintenance program includes inspections to detect and correct minor deficiencies before they develop into major defects resulting in costly repairs. This also includes cleaning and servicing.

To perform this task, follow these steps:

Step 1: Cleaning.

Keep the vehicle clean. If you have trash or dirt all over the vehicle, you won't be able to find lubrication points from the lube charts. It will also be hard to inspect the equipment for damaged or loose bolts.

Step 2: Lubrication.

Lubricate the vehicle according to intervals listed in the maintenance chart. If operating the machine in severe conditions then lubricate the machine more frequently. Be sure to remove all dirt from the grease fittings before lubricating and remove any grease that remains on the fitting after lubrication.

Step 3: Refueling.

Refueling the vehicle is easy, simply drive to the service station and fill the fuel tank. If your equipment can't be driven to the service station, you must arrange for the fuel truck to come to the job site. You should fuel any equipment operated **at the end of each working day** to prevent moisture from condensing and forming droplets in the fuel tank.

Step 4: Post Operation Inspection.

As stated in operational checks, inspection is the best way to ensure that you give the proper care to your equipment. Air intake breathers are of special importance. There are generally two elements: (1) the primary (outer) element and, (2) the secondary (inner) element. Under dusty operating conditions, clean both elements daily (even more often if working conditions are extremely dusty).

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**Review Questions
for
Perform Operator Maintenance**

Question	Answer
1. Why is cleaning an important part of vehicle maintenance?	a. To minimize breakdowns and save the AF money b. It is required by AF Form 1806 c. So it looks good d. It isn't
2. Ensure the vehicle always has a full tank of fuel at the end of each duty day.	a. True b. False

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PERFORM OPERATOR MAINTENANCE

Performance Checklist		
Step	Yes	No
1. Cleaned?		
2. Lubricated?		
3. Refueled?		
4. Performed post-operational inspection?		

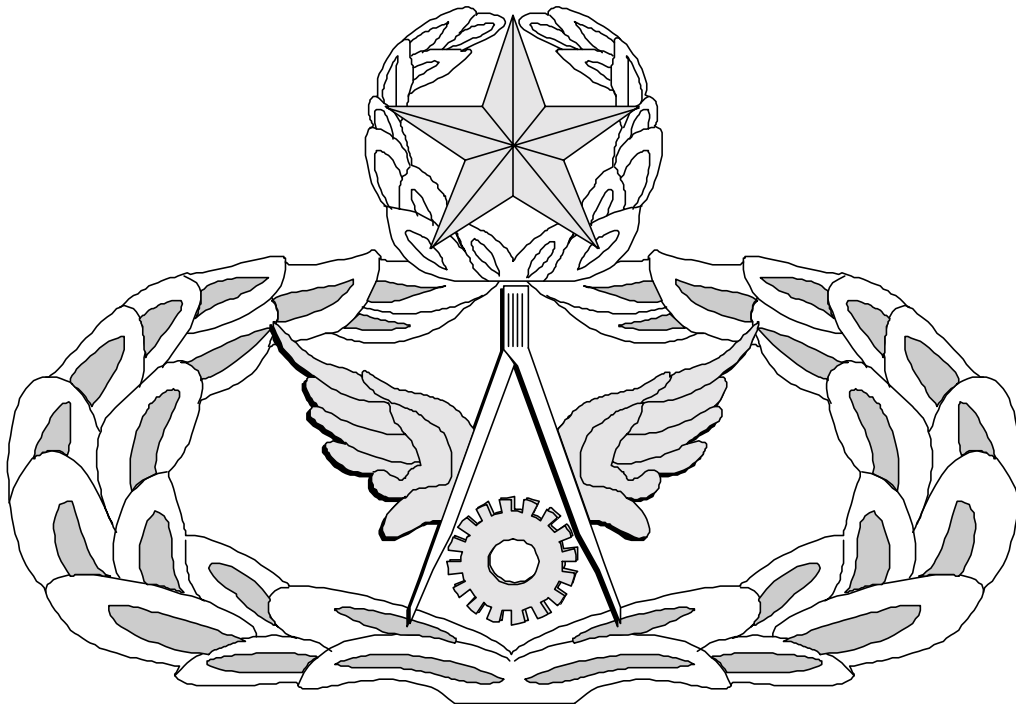
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Air Force Civil Engineer

QUALIFICATION TRAINING PACKAGE (QTP)

REVIEW ANSWER KEY



For
Pavements & Construction Equipment Operator

(3E2X1)

MODULE 16

COMPACTION EQUIPMENT

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Key-1

**PERFORM OPERATIONAL CHECKS
(3E2X1-16.1.)**

Question	Answer
1. On the steel wheel roller, how do you increase the weight of the roller?	a. By adding water to the roller drums.
3. The inspection is the same on all rollers?	b. False

**STEEL WHEEL VIBRATORY ROLLER
(3E2X1-16.2.4.)**

Question	Answer
1. What type of compaction uses shock waves?	c. Dynamic compaction
2. Compaction is best achieved if done in _____ to _____ inch lifts?	c. 3; 6
3. When compacting subgrade and base course, how much overlap should you have?	a. 12 inches to half the drum

**PERFORM OPERATORS MAINTENANCE
(3E2X1-16.3.)**

Question	Answer
1. Why is cleaning an important part of vehicle maintenance?	a. To minimize breakdowns and save the AF money.
2. Ensure the vehicle always has a full tank of gas at the end of each duty day.	a. True

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